ABSTRACT
This paper presents a collaborative platform that allows a set of judges (evaluators) to form business process (BP) groups based on the relationship of a user’s query with the BPs stored in a repository and the relevant results to that query. Queries are expressed as complete BP and are presented to the evaluators in order to allow them to form groups of BP taking into account similarity relationships. Additionally, each evaluator can compare the concordance or discordance of his results with relevance judgments issued by other evaluators; in this way evaluator can collaborate in the global evaluation process or change his evaluations. Results of the evaluation can be used to assess the quality of the results retrieved by an automatic BP similarity tool. The proposed platform was evaluated with a set of 54 users and results are promising.

Keywords

1. INTRODUCTION
Business process (BP) models capture the set of procedures or interrelated activities that collectively develop a common business goal within the context of an organizational structure [1]. Commonly, BPs is stored in closed repositories that may contain large quantities of reusable BP models.

However reusing BP models requires search mechanisms effective capabilities to find similarities between them. Some of these mechanisms apply data mining techniques (e.g., clustering) to build a BP model group hierarchy based on the similarity of operational characteristics found in BP models [2].

Most of the BP Model searching mechanisms for clustering have been evaluated theoretically based on laboratory tests, i.e., the evaluation addresses mainly the quality and performance on automatic BP models clustering [3-4].

In this sense this paper presents a platform that allows a set of judges (evaluators) to manually group BP model groups in a collaborative environment named “CollaborativeGroupBP”.

Accordingly, the formed groups by evaluators provide a basis to check validity and consistency of groups automatically created by different BP clustering mechanisms.

2. PROPOSED PLATFORM
The proposed platform, providing an infrastructure integrates a group of judges in a collaborative environment in order to create and retrieve BP model groups defined by them manually in a consensus. The platform functionality is divided into two modules (Figure 1).

- Relevant Results Definition
This module allows judges to define collaboratively which results are truly relevant to each query. The evaluation is based on a Likert scale with the following concepts: highly relevant, relevant, somewhat relevant, low relevant. The relevance evaluation is divided into three stages: Individual evaluation, Consensus searching on discordant evaluation, Refinement results. Results considered as relevant to each query will be used to form the groups.

- Collaborative group’s formation
This module use the results considered as relevant to each query made by judges in the previous phase. From these results, the platform provides to judges the functionality of BP model group’s creation, through a consensus on a collaborative environment (see Figure 2). Every created group is defined by a name and some labels of the elements belonging to it. Judges can make changes in the name of each group. Each judge can select one or more items in the results list and drag them to the group; similarly, a judge can use the remove option to remove one or more items of the group. In addition, this module has a chat room where members can share points of views to define group name and the items within it. All of these functionalities are available in the Collaborative whiteboard. The Groups formed component acts as an intermediary between the collaborative whiteboard and the database; it captures all the attributes of each group created, finally, the Group’s database component stores the transactions records and the groups formed by the judges in each one of the platform modules.

Collaborative Grouping of Business Process Models

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3. USE EXPERIENCE

Regarding to group's formation we count with 54 people experts on BP management and modeling topics belonging to the Institute of Informatics (21) and School of Business Administration (30) of the Federal University of Rio Grande do Sul (Brazil) and (3) of Telecommunications Department of the University of Cauca (Colombia). We defined a set of 6 BP models as query items and lists of 20 results sorted by the search mechanisms. Then was explained the platform operation and its goals and finally was executed in a coordinated way the relevant results definition phase. In this phase, each judge performed an average of 360 manual comparisons, for a total number of 19440 comparisons among all judges. Based on the relevant results we got an average of 12.33 items considered as relevant to each query. Moreover, based on the number of the relevant results, the average of formed groups by query is 3.5; additionally, the average of elements belonging to each group is 3.55. This is due to the agreements number on judges' joint work, in the groups' creation and the elements' choice that belongs to each group.

<table>
<thead>
<tr>
<th>Queries</th>
<th>Relevant elements</th>
<th>Formed groups</th>
<th>Elements by group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>10</td>
<td>3</td>
<td>3.33</td>
</tr>
<tr>
<td>Q2</td>
<td>12</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Q3</td>
<td>13</td>
<td>3</td>
<td>4.33</td>
</tr>
<tr>
<td>Q4</td>
<td>11</td>
<td>3</td>
<td>3.66</td>
</tr>
<tr>
<td>Q5</td>
<td>14</td>
<td>4</td>
<td>3.5</td>
</tr>
<tr>
<td>Q6</td>
<td>14</td>
<td>4</td>
<td>3.5</td>
</tr>
</tbody>
</table>

The quantity of groups formed by each query allows having a test dataset partitioned in sets, where the elements belong to a specific group that is identified by a unique label. Generating groups by judges helps to know a priori the complete set of possible elements that are part of the cluster for a specific query. Consequently, these groups can be used to evaluate the overall group's formation quality of a model automatic grouping (i.e. accuracy).

4. CONCLUSIONS

A manual creation of BP groups by judges using the collaborative platform allows to add items that truly are in the context of the group they belong. The consensus formation of BP model groups allows the overlap decreasing (existing elements in more than one group), generating thereby coherent groups. Using results considered as relevant in a query allows increasing the consistency in the groups and decreasing the time in group's creation. Finally, formed groups can serve as basis for comparison (precision's evaluation) of any clustering BP mechanism.

5. REFERENCES